

Listing of the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application.

1. (Previously Presented) An illuminator for illuminating a subject that is imaged by an image sensor comprising:

a first ring light source arranged around a perimeter of a predetermined shape communicating with a first light pipe defining a hollow tube having a cross-section with the predetermined shape, the first light pipe defining an inner lumen through which the sensor views the subject and the light pipe including a tip adapted to project a low-angle dark field illumination pattern on the subject; and

an electronic controller that selectively controls predetermined portions of the first ring light source to project a variable light around the perimeter.

2. (Original) The illuminator as set forth in claim 1 further comprising a second ring light source communicating with a second light pipe, the first light pipe being coaxial with respect to the second light pipe, the second light pipe having a tip adapted to project a high-angle bright field illumination pattern with respect to the subject.

3. (Original) The illuminator as set forth in claim 1 wherein the predetermined shape defines a circle.

4. (Original) The illuminator as set forth in claim 1 wherein the predetermined shape defines a rectangle.

5. (Original) The illuminator as set forth in claim 1 wherein the perimeter of the predetermined shape defines a shape that reduces a field of view of the image sensor.

6. (Original) The illuminator as set forth in claim 1 wherein the predetermined shape defines a curved shape.

7. (Original) The illuminator as set forth in claim 1 wherein the predetermined shape defines a shape conforming to dimensions of a predetermined subject.

8. (Original) The illuminator as set forth in claim 1 wherein the first light pipe and the first ring light source are each mounted on a handheld scanning appliance.

9. (Previously presented) The illuminator as set forth in claim 8 further comprising a set of light sources that each project a beam at a predetermined point with respect to the subject to thereby assist aiming of the image sensor at the subject.

10. (Original) The illuminator as set forth in claim 1 further comprising a set of light sources that each project a beam at a predetermined point with respect to the subject to thereby assist aiming of the image sensor at the subject.

11. (Previously Presented) An illuminator for illuminating a subject that is imaged by an image sensor comprising:

a first ring light source arranged around a perimeter of a predetermined shape communicating with a first light pipe defining a hollow tube having a cross-section with the predetermined shape, the first light pipe defining an inner lumen through which the sensor views the subject and the first light pipe including a tip adapted to project a low-angle dark field illumination pattern on the subject; and

a second ring light source coaxial with respect to the first ring light source and communicating with a second light pipe coaxial with the first light pipe, the second light pipe having a tip adapted to project a high-angle bring field illumination pattern with respect to the subject.

12. (Original) An illuminator as set forth in claim 11 further comprising a controller that selectively controls predetermined portions of the first ring light source to project a variable light around the perimeter.

13. (Original) The illuminator as set forth in claim 11 wherein predetermined shape defines a circle.

14. (Original) The illuminator as set forth in claim 11 wherein predetermined shape defines a rectangle.

15. (Original) The illuminator as set forth in claim 11 wherein the perimeter of the predetermined shape defines a shape that reduces a field of view of the image sensor.

16. (Original) The illuminator as set forth in claim 11 wherein the predetermined shape defines a curved shape.

17. (Original) The illuminator as set forth in claim 11 wherein the predetermined shape defines a shape conforming to dimensions of a predetermined subject.

18. (Original) The illuminator as set forth in claim 11 wherein the first light pipe and the first ring light source and the second light pipe and the second ring light source are each mounted on a handheld scanning appliance.

19. (Original) The illuminator as set forth in claim 11 further comprising a set of light sources that each project a beam at a predetermined point with respect to the subject to thereby assist aiming of the image sensor at the subject.

20. (Original) The illuminator as set forth in claim 11 wherein each of the first light pipe and the second light pipe are mounted together with a securing ring sized and arranged to secure to a camera assembly.

21. (Original) The illuminator as set forth in claim 20 wherein the mounting ring is constructed and arranged to removably secure the first light pipe and the second light pipe to the camera assembly.

22. (Previously Presented) An illuminator for illuminating a subject that is imaged by an image sensor comprising:

a first ring light source arranged in a perimeter of a predetermined shape communicating with a first light pipe having a cross-section with the predetermined shape, the first light pipe defining an inner lumen through which the sensor views the subject and the first light pipe including a tip adapted to project a low-angle dark field illumination pattern on the subject;

a second ring light source coaxial with respect to the first ring light source and communicating with a second light pipe coaxial with the first light pipe, the second light pipe having a tip adapted to project a high-angle bright field illumination pattern with respect to the subject; and

wherein the second ring is nested within the first ring and wherein the tip of the second ring is recessed with respect to the tip of the first ring so as to provide an area in an inner wall of the first ring adjacent to the tip of the first ring for projection of the low angle dark field illumination pattern therefrom.

23. (Previously Presented) An illuminator for illuminating a subject that is imaged by an image sensor comprising:

a ring light source arranged around a perimeter of a predetermined shape communicating with a light pipe defining a hollow tube having a cross-section with the predetermined shape, the light pipe defining an inner lumen through which the sensor views the subject and the light pipe

including a tip adapted to project a high-angle bright field illumination pattern with respect to the subject.

24. (Original) The illuminator as set forth in claim 23 wherein predetermined shape defines a circle.

25. (Original) The illuminator as set forth in claim 23 wherein predetermined shape defines a rectangle.

26. (Original) The illuminator as set forth in claim 23 wherein the perimeter of the predetermined shape defines a shape that reduces a field of view of the image sensor.

27. (Original) The illuminator as set forth in claim 23 wherein the predetermined shape defines a shape conforming to dimensions of a predetermined subject.

28. (Original) The illuminator as set forth in claim 23 wherein the light pipe and the ring light source are each mounted on a handheld scanning appliance.

29. (Original) The illuminator as set forth in claim 23 further comprising a set of light sources that each project a beam at a predetermined point with respect to the subject to thereby assist aiming of the image sensor at the subject.

30. (Previously Presented) An illuminator for illuminating a subject that is imaged by an image sensor having a field of view comprising:

a ring light source arranged around a perimeter of a predetermined shape communicating with a light pipe defining a hollow tube having a cross-section with the predetermined shape, the light pipe defining an inner lumen through which the sensor views the subject and the light pipe including a tip adapted to project an illumination pattern with respect to the subject; and

wherein the illumination pattern covers a reduced area with respect to the field of view whereby an aiming location is highlighted by the illumination pattern.

31. (Original) The illuminator as set forth in claim 30 wherein the light pipe includes a tip adapted to project a high-angle bright field illumination.

32. (Original) The illuminator as set forth in claim 30 wherein the light pipe includes a tip adapted to project a low-angle dark field illumination.

33. (Original) The illuminator as set forth in claim 30 wherein the light pipe is mounted on a handheld scanning appliance.

34. (Previously Presented) An illuminator for illuminating a subject that is imaged by an image sensor comprising:

a first ring light source arranged around a perimeter of a predetermined shape communicating with a first light pipe defining a hollow tube having a cross-section with the predetermined shape, the first light pipe defining an inner lumen through which the sensor views the subject and the light pipe including a tip adapted to project a low-angle dark field illumination pattern on the subject; and

a bright field illuminator located external to the light pipe.

35. (Original) The illuminator as set forth in claim 34 wherein the bright field illuminator comprises a ring coaxial with the light pipe.